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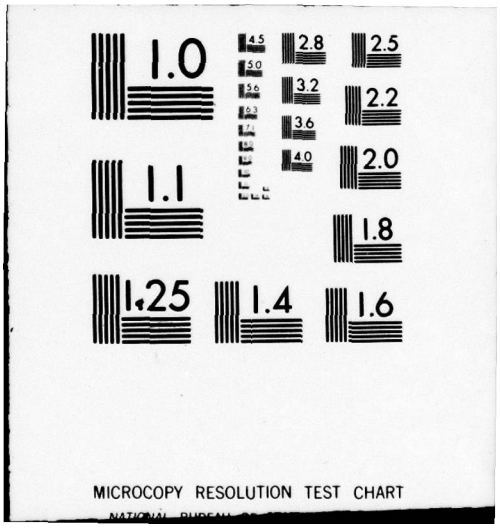
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NAVAL POSTGRADUATE SCHOOL

Monterey, California

THESIS

AN ANALYSIS OF THE NATIONAL DEFENSE RESERVE FLEET, THE READY RESERVE FORCE COMPONENT AND THEIR CAPABILITY TO MEET NATIONAL EMERGENCY

by

Louis Francis Harlow

September 1979

Thesis Advisor: R.W. Sagehorn

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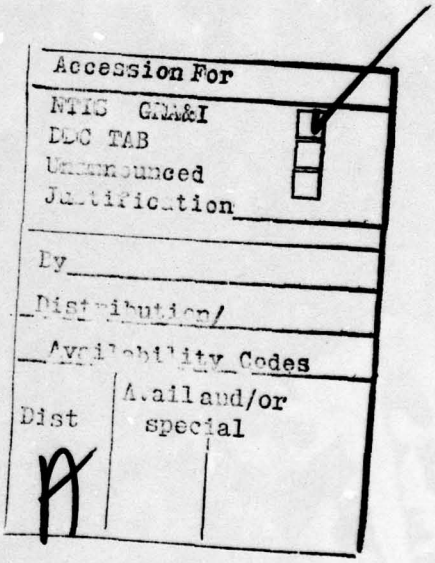
Conclusions are drawn from its past performance, documented present status, and projected industrial capabilities.



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An Analysis of the National Defense Reserve Fleet, the Ready Reserve Force Component and Their Capability to Meet National Emergency

by

Louis Francis Harlow
Lieutenant Commander, United States Navy
B.S.M.T., State University of New York at Fort Schuyler, 1968

Submitted in partial fulfillment of the requirements for the degree of

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Author Louis F. Harlow

Approved by: R. W. Bauglum
Thesis Advisor

Ed Finke
Second Reader

Chairman, Department of Administrative Sciences

D. A. Schrady
Dean of Information and Policy Sciences

ABSTRACT

This study examines various facets of activating the National Defense Reserve Force. Its history and background are reviewed and its present status of readiness considered. Specific areas covered are monetary costs, manpower capabilities (seagoing and ashore) as well as the physical condition and capabilities of the fleet.

The sub-structure of the Reserve Fleet known as the Ready Reserve Force is covered in depth. In this area the inception of the ready force idea is presented along with its goals and accomplishments to date. Of unique interest is the joint funding of the Ready Reserve Force which is contributed to by both the Department of Commerce and the Department of Defense.

Conclusions are drawn from its past performance, documented present status, and projected industrial capabilities.

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LIST OF EXHIBITS

ABBREVIATIONS

1.	ABS	-	AMERICAN BUREAU OF SHIPPING
2.	CAB	-	CIVIL AERONAUTICS BOARD
3.	CFR	-	CODE OF FEDERAL REGULATIONS
4.	D/H	-	DEHUMIDIFICATION
5.	DOC	-	DEPARTMENT OF COMMERCE
6.	DOD	-	DEPARTMENT OF DEFENSE
7.	DWT	-	DEAD WEIGHT TONNAGE
8.	FCC	-	FEDERAL COMMUNICATION COMMISSION
9.	FYDP	-	FIVE YEAR DEFENSE PLAN
10.	GAA	-	GENERAL AGENCY AGREEMENT
11.	GAO	-	GOVERNMENT ACCOUNTING OFFICE
12.	GNP	-	GROSS NATIONAL PRODUCT
13.	JCS	-	JOINT CHIEFS OF STAFF
14.	LASH	-	LIGHTER ABOARD SHIP
15.	LNG	-	LIQUEFIED NATURAL GAS
16.	MARAD	-	MARITIME ADMINISTRATION
17.	MRC	-	MASTER REPAIR CONTRACT
18.	MSC	-	MILITARY SEALIFT COMMAND
19.	MSD	-	MARINE SANITATION DEVICE
20.	MSTS	-	MILITARY SEA TRANSPORTATION SERVICE
21.	NDRF	-	NATIONAL DEFENSE RESERVE FLEET
22.	NSA	-	NATIONAL SHIPPING AUTHORITY
23.	OMB	-	OFFICE OF MANAGEMENT AND BUDGET
24.	Ro/Ro SHIPS	-	ROLL ON/ROLL OFF SHIPS

25. RRF - READY RESERVE FORCE

26. SCA - SHIPBUILDERS COUNCIL OF AMERICA

27. SPANS - SEALIFT PROCUREMENT AND NATIONAL SECURITY

28. USCG - UNITED STATES COAST GUARD

I. INTRODUCTION

A. INTEREST AND METHODS

The National Defense Reserve Fleet (NDRF) has been of great interest to the author having seen many of its ships in service throughout Southeast Asia during the Vietnam action. The thought of millions of dollars in assets "mothballed" and idle supposedly constantly ready for service was the driving theme behind this paper. How this use or lack of use of taxpayers' funds can be justified in this era of Proposition 13 the author believes deserves closer scrutiny. Specifically this paper is focused on how this situation came about, how it has continued, and why. In general the paper attempts to answer the question "Is the NDRF necessary and, if it is, is it being properly maintained and ready if called upon again by the Department of Defense?"

In the search for facts and information various interviews were conducted both personally and by telephone. Cooperation from the Maritime Administration (MARAD) was excellent. Both the Western Regional Office in San Francisco, California and the Washington D.C. Headquarters were extremely helpful. Material was readily available from both MARAD and the Naval Postgraduate School Library, however, it appears that an eighteen month to two year time lag is present between events occurring and the information being available in print.

B. DEFINITION

The purpose of the National Defense Reserve Fleet is to serve as an inactive reserve for selected ships which would be activated in order to meet the shipping requirements of the United States during national emergencies.(4:1) The NDRF currently consists primarily of World War II Victory ships and assorted Naval auxiliary ships.

The Maritime Administration has the authority to place in reserve for national emergency purposes those ships which it deems necessary for future defense requirements. The choice of retention ships is made by MARAD in conjunction with the Secretary of the Navy.(4:1)

The current functions of the NDRF program are two fold in purpose. First, the preservation of those ships that are required by law which are considered eligible for retention. Second, the disposal of non-retention ships, that is those ships no longer considered necessary for national defense.

The ships designated as retention ships are placed under a rigorous program of preservation and maintenance with the objective of performing all work necessary to maintain them in the same or better condition than they were received in by the fleet. In view of the unspecified time frame for lay up, the ships are presumed to be in "lay-up" for an indefinite period. In this condition, these ships would require thirty to forty days of activation, once called upon.(4:1) Non-retention ships are usually sold for scrapping purposes on the open market.

C. THE PROBLEM

Presently the NDRF is comprised mostly of dry-cargo vessels capable of self discharge, especially suited for outsize military cargo, such as the Army's main battle tank. Ships of this type are commonly referred to as break-bulk vessels . Although multi-purpose in nature and very versatile a large majority of the ships assigned to the NDRF are small, slow, and old. Therefore they have been bypassed technologically and are in need of modernization.

New ship designs, those post dating World War II, have generally been in the direction of the intermodal type, mainly non-self sustaining containerships, Roll-on/Roll-off (Ro/Ro), Lighter Aboard Ship (Lash), and specialized cargo carriers such as Liquefied Natural Gas (LNG) type ships. While these specialized vessels are highly profitable and competitive in world trade they lack one or more of the defense-desirable features found in the general purpose break-bulk vessels of the NDRF.(5:55)

As American shipbuilders produce fewer general cargo ships and the existing break-bulk ships age and are scrapped the Department of Defense (DOD) sealift problems increase. Additionally as DOD break-bulk capabilities are reduced in the active merchant fleet the NDRF and its break-bulk capacity will increase in importance for national defense purposes as the only domestic source of break-bulk shipping available to augment the U.S. Merchant Marine and/or the U.S. Navy in time of need. The necessity for the NDRF is not in question, and the concept is accepted and supported by DOD.

However, problem areas do arise in regard to the NDRF. Specifically a majority of the ships in the fleet are in excess of thirty years of age and have not been used in over nine years therefore their capability of meeting DOD requirements is in question. It can be expected that these ships will have to be replaced eventually if the NDRF is to remain a viable arm of national defense, and the question of cost effectiveness, in this era of cost conscious taxpayers, places the entire program in jeopardy. Finally the ultimate problem for DOD is whether the NDRF can be placed in service quickly enough to meet national or global emergencies effectively and efficiently as they have in the past.

D. INTENT

It is the overall intent of this study to investigate the current capabilities of the merchant reserve fleet, the direction and course of action undertaken by MARAD and DOD in order to update and enhance the United States NDRF and to meet their objectives.

Specifically special attention will be focused on the Ready Reserve Force (RRF) program recently undertaken jointly by MARAD and DOD in order to ensure the readiness and availability of the NDRF.

E. ASSUMPTIONS

The assumptions listed below have been imposed throughout this study. They are neither new nor are they original but rather observations of history and general policy in this country:

1. The United States will, because of its political and military leadership position in the world, continue to need a strategic deterrent and a complete capability to conduct both total and selected warfare, and a merchant marine is part of that capability and deterrent.
2. The United States will not embark on an all encompassing program to revitalize the country's merchant marine nor will it develop an overall and integrated maritime policy.
3. Time and technology will continue to advance and the American Merchant Marine will continue to excel in the field of advanced Marine Technology. American shipping companies and shipbuilders have been innovators in developing faster and more technologically advanced merchant ships.(9:23)
4. The necessity and viability of the merchant marine and the NDRF as the fifth arm of defense can be measured and will continue to be needed and required by DOD.

II. BACKGROUND

A. CREATION

At the end of World War II the United States government held title to more than 5,000 vessels. In order to reestablish world trade the U.S. government decided to sell these vessels to American citizens and foreign nationals. This action of providing the means of transportation for international trade was expected to stimulate and renew world commerce. The legislation utilized to achieve the disposal of the excess shipping was the Merchant Ship Sales Act of 1946.

The Ship Sales Act gave United States citizens preference in purchasing excess government vessels and also allowed for trade-in of old ships as credit toward the newer war built ships. Buying of war surplus ships was also open to foreign nationals provided the vessels were not needed for future defense purposes or deemed a necessity for the American Merchant Marine.

Although sales terms were liberal for both U.S. citizens and foreign nationals, legislators realized that a large majority of the surplus ships would not be sold and that a considerable number of them would remain unused. In order to address this particular problem the Ship Sales Act created a government-owned and administered National Defense Reserve Fleet, which would remain idle and ready for service until needed.

These ships originally were incorporated into eight different sheltered backwater anchorages located throughout the United States. On the Atlantic Coast the locations were Hudson River, New York, James River, Virginia, and Wilmington, Delaware. The Gulf Coast fleets were situated at Mobile, Alabama and Beaumont, Texas. The Pacific Coast ships were anchored at Suisun Bay, California, Astoria, Oregon and Olympia, Washington. On July 1, 1945 there 1,421 ships in the NDRF. Exhibit 1 is a breakdown of the total number of NDRF ships by Fiscal Year in the combined anchorages.

At the time of establishment the ships in the NDRF were mostly of World War II construction. As a result of world shipping fluctuations periodic demands were placed on the NDRF and a small number of ships cycled in and out of the fleet. In 1950 an amendment to the Ship Sales Act allowed the bareboat charter of NDRF ships for use in any service not adequately served by U.S. flag, private operators on reasonable conditions at reasonable rates.(6:28) The bareboat charter required the charterer to perform all functions of an owner and only supplied an unmanned and unprovisioned ship.

The Ship Sales Act of 1946 does not require that every ship in the NDRF be maintained indefinitely nor does it preclude additions to the fleet. As the immediate demand for shipping after World War II subsided, many ships were returned by their owners to the NDRF, and at the end of fiscal year 1950 the fleet had increased to 2,277 vessels.

EXHIBIT 1

National Defense Reserve Fleet 1945-1979

FISCAL YEAR	SHIPS	FISCAL YEAR	SHIPS
1945	5	1962	1862
1946	1421	1963	1819
1947	1204	1964	1739
1948	1675	1965	1594
1949	1934	1966	1327
1950	2277	1967	1152
1951	1767	1968	1062
1952	1853	1969	1017
1953	1932	1970	1027
1954	2067	1971	860
1955	2068	1972	673
1956	2061	1973	541
1957	1889	1974	487
1958	2074	1975	419
1959	2060	1976	348
1960	2000	1977	333
1961	1923	1979	318

Sources: 1. MARAD 1977 (2,69)

2. Ships in The National Defense Reserve Fleet by Design (10:1)

In 1950 the Maritime Administration (MARAD) was created as an agency within the Department of Commerce (DOC) to assume responsibility for the preservation and maintenance of the NDRF. On January 15, 1951 the legislation which authorized the sales of NDRF ships to operators for commercial trade purposes expired. Because of this expiration reserve ships could thereafter only be sold for scrap or for non-transportation purposes or broken out only in time of national emergencies.(6:28)

Presently the ships of the NDRF are still under the control of MARAD but their numbers have been reduced to 318. The vessels in the fleet are of various ship types mainly Victories, C-3-S-33a, Mariners, and Seatrains. The funding for the NDRF comes from both DOC and DOD and will be addressed later in this study.

B. ACTIVATION

Throughout the thirty-four year history of the NDRF it has been called upon many times to support various national emergencies both military and non-military in nature. The first national crisis that the NDRF participated in began in 1950 when the United Nations, along with the United States, deemed it necessary to support South Korea, which was resisting the aggressions of North Korea. The fact that privately owned shipping could not meet the military sealift demand for the conflict quickly became apparent. Over an eighteen month period during the Korean hostilities 778 U.S. government-owned vessels were withdrawn from the NDRF, repaired, refitted, and placed in service.(4:7)

While the Korean action placed unexpected demands on world shipping another situation develped half a world away which pushed shipping capabilities to their limits. The extremely severe winter of 1950 created an inordinately high demand for American coal in Europe which in turn caused a shortage of bulk shipping capabilities. The end result of this shortage was that the freight rates on coal more than tripled from $3.50 a ton to $13.00 a ton in less than one year as demand out-distanced supply. This development clearly jeopardized the Marshall Plan because aid money was being unproportionately spent for shipping charges. Action was vitally needed to drive down shipping costs to ensure that the aid money went to rebuild war-torn Europe. Again the NDRF was called into service and the result was that freight rates dropped as supply met demand with the introduction of more bottoms.

As the coal problem in Europe was alleviated a more desperate situation developed in India. Crop failures caused food shortages in that country and massive imports of grain were deemed necessary if the new and fragile democratic government was to survive. Political impacts aside only the NDRF could provide the tonnage necessary to move the amounts of grain needed.

By 1953 the world situation had stabilized and the temporary need for additional shipping had decreased considerably. However, in the United States a shortage of grain storage space had developed and a new use for the NDRF was about to

be discovered. On March 11, 1953 the Department of Agriculture requested the use of fifty Liberty ships to be used for surplus grain storage. By February 1954 MARAD had made available 317 ships in which 72 million bushels of grain were stored. The program of wheat storage lasted for ten years and at one time the NDRF had on board ten percent of the total surplus price supported wheat in the United States.(6:29)

In 1956 the "Suez Crisis" started first with the Egyptian nationalization of the Suez Canal quickly followed by the Anglo-French expeditionary force seizure of the canal. In retaliation the Egyptian forces scuttled ships which very effectively blocked the usage of the waterway. The net result of this conflict was an eventual rise of charter rates as high as three hundred percent on some world trade routes as once again demand out-stripped supply.(6:29) These universal rate hikes again placed a severe burden on the American treasury because of the extensive U.S. aid program then being conducted throughout the world. As in the past the NDRF was called upon successfully to increase shipping tonnage and decrease overall world freight rates.

On July 16, 1965 DOD requested MARAD to activate fourteen Victory type ships and to place them in service at the earliest possible moment. Once again the aging ships of the NDRF were to go into service, this time in Southeast Asia. By the end of 1966, 161 of the 173 General Agency Agreement (GAA) ships then in service had been activated from the NDRF.(4:7) Under

the GAA a NDRF ship was operated by a private shipping company for use by DOD. When the need for government ships ended in 1970 only 123 ships were returned to the NDRF for retention and preservation. The remaining fifty ships were designated as not required and were sold on the world market.

C. RENEWED INTEREST

The decade of the fifties saw an almost continual use of the NDRF. However, technology was already quickly surpassing the fleet. During that decade the S.S. United States was launched, and it was reputed to have a top speed approaching forty knots, far surpassing any ship previously built.(6:33) Also the N.S. Savannah was constructed putting the merchant marine in the realm of nuclear power. Probably the most important commercial marine break-through in modern times started in 1956 when Malcom P. Mclean, a former truck-line executive, proved it was feasible to stow cargo aboard ship in truck containers. This single innovation changed the face of the U.S. Merchant Marine and led to a dramatic decrease in the commercial use of break-bulk ships.

In 1960 a joint Navy-MARAD group determined that many NDRF ships no longer were beneficial for national defense. As a result only 891 ships were selected for continued retention, with the remaining ships designated for scrapping. These ships were broken into two groups, the first Navy priority ships and the second MARAD priority ships. These two groups were further

broken down to number categories with certain ships being given preference with respect to maintenance and repair.(6:30)

On October 23, 1969 the Merchant Marine Act of 1970 became law. The purpose of this legislation was to revitalize the United States Merchant Marine. Although during debate over the bill the NDRF was discussed and actions proposed, nothing concerning the NDRF was actually accomplished. When the legislation was finally enacted it was silent concerning the NDRF.

In November of 1970 the last of the NDRF ships activated for service in Southeast Asia were deactivated. The ships had done their job. However, the future of the NDRF was becoming doubtful as the ships approached thirty years of age, clearly decisions concerning the NDRF had to be made.

Various proposals surfaced concerning the fleet. In 1971 DOD sponsored a far-reaching review of the NDRF known as the "Sealift Procurement and National Security" (SPANS) study. Among other things it recommended the purchase of relatively new ships for the NDRF that would otherwise be sold to foreign countries or scrapped. In 1972 $30 million was added to the Department of Commerce budget request for the purchase of such shipping. However, this request was disallowed by the Office of Management and Budget (OMB) on the grounds that the NDRF was military in nature and as such funding for upgrading should come from DOD.

Although MARAD was responsible for the NDRF interest was obviously low in the first half of the seventies. Naturally

MARAD attention focused on revitalizing the active merchant fleet in conjunction with the Merchant Marine Act of 1970. For fiscal year 1975, the total MARAD budget request was $586,162,000. Of this amount $4,358,000 - less than one percent was designated for NRDF support.(6:31) Although little money entered the NDRF it generated a great deal of revenue. Exhibit 2 shows revenues acquired for ships sold as scrap or for non-transportation purposes for the U.S. government.

EXHIBIT 2

Ships Sold For Scrap

YEAR	SHIPS SOLD	VALUE
1976	75	$11,908,283
1977-T	2	$ 470,000
1977	21	$ 2,610,826
1958-1977	2,270	$192,200,000

Sources: 1. MARAD 1976 (3:49)
2. MARAD 1977 (2:65)

On January 2, 1975 Public Law 93-045 was signed. It authorized the Secretary of Commerce to acquire Mariner class vessels from private owners (who would otherwise scrap them) in exchange for obsolete ships from the NDRF which could then be scrapped. The expressed purpose of this law was to upgrade the NDRF with newer ships specifically Mariner class hulls built around 1952.

Early in 1976 discussions were held between Navy and MARAD personnel with an objective for developing an approach to provide DOD with sufficient break-bulk shipping during national emergencies in the shortest possible time. To accomplish this goal MARAD proposed that thirty of the NRDF ships be upgraded by a four phased plan. The DOD accepted this proposal and the Navy's Program Objective Memorandum for FY 1977 provides for Navy funding to commence work.(8:1) OBM apparently accepted this program in view of the fact that DOD and not MARAD money was utilized. At the beginning of FY 1977 the U.S. Navy transferred to MARAD $5.2 million to begin upgrading selected ships to Ready Reserve Fleet status.(2:65)

III. THE PROBLEM

A. PAST EXPERIENCE

As cited earlier the ships of the NDRF have been utilized for national defense purposes twice during their thirty-four year existence. Each time the ships were called upon they performed well but not without difficulties and certainly not without costs. The two defense related call ups discussed refer to the Korean Police Action and the conflict in Southeast Asia.

1. Korea: As of mid 1950, there were 2277 ships in the various reserve fleets: 239 were Victory ships, 1564 Liberty ships and the remainder were miscellaneous military and pre-World War II vessels. During the Korean hostilities 778 Government-owned ships were withdrawn, repaired, refitted, and placed in service.(1:23) The method of utilizing these ships was the General Agency Agreement (GAA). Within DOD the ships came under the auspices of the Military Sea Transportation Service (MSTS). The private operator was responsible for overseeing repairs, providing a crew, and general provisioning. The government paid for the break-out costs, and activation costs in addition to the private operators expense and fees.

In March of 1951 the National Shipping Authority (NSA) was established to provide the administrative machinery to supervise the operation of the reactivated vessels. From mid-March through December 1951, the NSA activated 443 vessels. The

cost of activation was $60 million or $135,000 per ship. By the second quarter of 1952 GAA ships decreased to 183 and government vessels on charter fell to 91 by mid-1952. As the need for the NDRF ships decreased they were returned to the reserve fleet at an average cost of $19,000 per ship.(4:7)

Although break-out times were excellent (an average of more than three ships every two days) and costs were reasonable it should be pointed out that the ships were fairly new and required little preparation. Even though time and cost figures are impressive for the NDRF during the Korean Action they do not tell the full story.

During that national emergency the most acute problem encountered by activating the NDRF was the shortage of sea-going manpower. The number of seaman jobs increased dramatically from 57,000 in June 1950 to 87,000 in June 1951 an increase of fifty-three percent in one year.(1:24) Although jobs were plentiful at sea, personnel to fill them were in short supply. Specifically high wages and plentiful job opportunities ashore coupled with the uncertain future of a long career at sea made seafaring at this time unenhancing for many. This shortage occurred even though there was an abundance of trained maritime personnel in the country with experience dating back to World War II. This shortage of skilled seamen in all ratings both crew and officers seriously delayed many sailings.(4:7)

2. Vietnam: The next military demand on the NDRF began fifteen years later on July 16, 1965. At this time there were

1,594 ships in the reserve fleet and of them only 960 ships were under preservation.(5:53) As during the Korean Police Action the ships operated under General Agency Agreement contracts with private operators. By 1970 a total of 173 ships were under GAA and of these 161 had been activated between 1965 and 1970. They moved more than thirty percent of all cargo to Southeast Asia. Interestingly, during the Vietnam conflict ninety-six percent of all military freight moved by sealift under the auspices of the Military Sealift Command (MSC) which had replaced the MSTS.

The first fifty-one ships activated were placed on berth between twenty-one and forty-three days (See Exhibit 3). All activation costs for the first forty-seven ships averaged $500,000 per ship.(1:25) The initial group of fourteen ships were worked on around the clock and all short cuts allowed by safety requirements were taken.

During the initial operating period, approximately one year, about seventy percent of the fifty-one ships activated in 1965 suffered casualties resulting in lost time averaging ten days per ship.(1:27) Most major ship casualties occurred within the first three months of operation with boilers accounting for about one-third of all casualties. Appendix A lists problem areas causing lost time on reactivated Vietnam conflict ships.

During the six year period of operation, maintenance and repair costs totaled $84,940,291 for an average of $445 per voyage day.(1:28) Appendix B displays the number of voyage days, total maintenance, and repair costs per voyage day for

EXHIBIT 3

Activation Time Frames For Vietnam

ACTIVATION FLIGHT NO.	NUMBER OF SHIPS	AVERAGE DATE PLACED IN SHIPYARD	AVERAGE DATE ON BERTH	AVERAGE DAYS IN SHIPYARD
1	14	July 17, 1965	Aug. 7, 1965	21
2	8	Aug. 17, 1965	Sept. 27, 1965	41
3	28	Aug. 28, 1965	Oct. 10, 1965	43
4	1	Oct. 19, 1965	Nov. 21, 1965	31
5	25	Dec. 15, 1965	Feb. 6, 1966	53
6	6	Feb. 7, 1966	Apr. 15, 1966	67
7	6	Mar. 12, 1966	May 15, 1966	64
8	6	Apr. 12, 1966	June 15, 1966	64
9	7	May 12, 1966	July 15, 1966	64

Source: National Defense Reserve Fleet Response Plan (1:26)

each year of reserve fleet vessel usage during the Southeast Asia conflict. Activation and repair costs are broken down in Exhibit 4.

EXHIBIT 4

ACTIVATION AND REPAIR COSTS: The average shipyard costs to reactivate, maintain and repair, and deactivate NDRF vessels during Vietnam use were as follows:

Reactivation	$476,937	(161 ships)
Maintenance and Repair	$490,984	(173 ships)
Deactivation	$ 45,392	(123 ships)
	$1,013,313	

Source: National Defense Reserve Fleet Response Plan (1:28)

Shipyard capabilities during this period generally were sufficient to meet the demand placed on them. However, difficulties onboard ship did arise from prolonged operations outside the United States. The general lack of repair facilities in the Western Pacific caused ship delays far out of proportion to the severity of the casualties.

As during the Korean Action manpower was a severe problem. From 1965 to 1968 personnel shortages caused delays in 592 of 1,405 scheduled sailings. Appendix C displays delayed sailings due to crew shortages. These shortages existed despite all

efforts made by MARAD, other Federal agencies, and private organizations to solve the problem. Reasons cited for this shortfall of seagoing personnel are as follows:

a. Lack of sufficient number of qualified crew.

b. Generous vacations requiring greater numbers of crews.

c. Reluctance to sail on older ships.

d. High attrition rate of licensed officers due to long periods at sea, high average ages and eligibility for retirement.

e. Inability of MARAD to have maritime personnel exempt from military service. (1:32)

Overall the aging ships of the NDRF performed well throughout the Vietnam conflict. Although break-downs occurred they were not the main cause for delays. Most delays were attributed to a shortage of Vietnamese docking facilities and crew shortages.(5:54) By November 1970, the last reserve ship was returned to the NDRF.

3. OTHER PAST PROBLEMS: Congressional hearings and MARAD/GAO reports indicated the following additional problem areas encountered in past activations.

a. Procurement - GAO found that MARAD had not established adequate procurement procedures for purchase of necessary equipment and supply items to outfit vessels.

b. GAA Operator Compensation - there were contentions from GAA operators that the compensation to husband vessels in the Vietnam reactivation ($75 per day initially, later revised to $125 per day) was non-compensatory.

c. GAA Funding Procedures - GAO concluded that excessive funds were being advanced to GAA agents, pointing out that the amount of cash advanced should be as close to daily needs

of recipient agent as administratively practicable, Marads' surveillance procedures over advanced funds were also criticized.

d. Other GAA Related Issues - these issues included the large number of agents, the continued expansion of agents no matter how marginally qualified and need for remedial action in case of inadequate performance.(1:35)

B. THE PRESENT

In order to activate a Victory ship of the NDRF in 1977 it was projected that it would take thirty to forty days. As discussed earlier DOD concluded that this time frame was unsatisfactory and deemed a five to ten day break out period for thirty Victory Ships was necessary.(4:11) Although the initial plan for the Ready Reserve Fleet composed of thirty World War II Victory ships was accepted by DOD and funded by the Navy, the Program was changed almost immediately.

In 1977 the trade-in of five C-3 break-bulk ships constructed in 1960-61 provided a more modern basis for the NDRF. Additionally, the "Seatrain" series of ships, which are fully self-sustaining, already in the NDRF presented to military planners a better alternative and a more efficient method of carrying vehicles and helicopters. Finally the addition of three Mariner Class vessels constructed in the 1950's joined the fleet in 1978 further offering newer, faster, and more modern ships for RRF status.

In view of the change taking place within the NDRF, MARAD in conjunction with the Navy altered the objectives of the RRF. The revised objectives were to first provide DOD with a sealift

capability equivalent to that of thirty Victory ships (approximately 340,000 measurement tons), that is a variety of ships types would be utilized rather than only Victories as originally planned, and second provide activation within five to ten days for deployment during national emergencies.(18:1) Obviously these goals cannot be met immediately. MARAD will, as money becomes available from the U.S. Navy, bring the required tonnage up to RRF standards. Exhibit 5 presents the ships in RRF status as of February 28, 1979 and the ships that may eventually join the fleet.

Although special attention has recently been given to the RRF ships it has not degraded the remaining ships in the NDRF. Even though the Victory ships are not utilized as much in the RRF as first planned they still constitute the largest, 130 out of 218, group of ships in the NDRF retention list for defense purposes.(10:3)

According to DOC the ships of the NDRF are deemed to be in good condition and properly maintained.(4:14) This is primarily due to the dehumidification (D/H) systems which have virtually eliminated interior corrosion and deterioration caused by moisture.(1:10) In addition to the D/H the ships are protected with a hull electrocathodic protection system to minimize underwater hull deterioration through corrosion or electrolytic action.

Additionally spare parts for the Victory ships have been carefully stored by the three remaining fleets aboard ship in

EXHIBIT 5

READY RESERVE FLEET SHIPS

TYPE	NAME	LOCATION	PURPOSE HELD
CS-S-33a	Pride	James River	RRF
C3-S-33a	Bay	James River	RRF
C3-S-33a	Cove	James River	RRF
C3-S-33a	Scan	James River	RRF
C3-S-33a	Lake	James River	RRF
VC2-S-AP2	Catawba Victory	James River	RRF
Container Carrier	Washington	Beaumont	RRF
C4-S-1P	Lone Star Mariner	James River	RRF
C4-S-1H	Old Dominion Mariner	James River	RRF
C4-S-1H	Cracker State Mariner	James River	RRF
LSD	8 Ships	James River Suisun Bay	RRF potential reactivation
AO's	9 Ships	James River Beaumont Suisun Bay	Possible Inclusion in RRF Program

Source: Ships in the National Reserve Fleet by Design (10:3)

Beaumont, Texas, Suisun Bay, California and in a warehouse in Kearney, New Jersey. The other four fleets having been phased out by 1973. These spare parts have been thoroughly reconditioned and are ready for use.

C. CURRENT PROBLEMS

1. THE ENVIRONMENT: The ships of the NDRF were constructed well before the increased emphasis on environmental protection. Two environmental requirements imposed by Federal law impact on the NDRF. First, new requirements necessitate that oily waste and oily bilge slops be retained aboard for later disposal at sea or in special containers in port and secondly there is a new requirement to collect and dispose of all sanitation effluent.

Both of the requirements cited above help ensure that the waterways and coastal areas of the United States no longer suffer the ravages of pollution from passing ships. By requiring vessels to retain on board oil wastes and sewage for proper legal disposal the environment will be better protected. Both requirements are fully described in Appendices D and E.

Because of the expense involved in complying with these requirements the NDRF is not expected to be upgraded to compliance until needed. When the NDRF is pressed into service the cost would probably be no object and the requirements met. If time does not permit waivers would most likely be obtained from the U.S. Coast Guard (USCG). The waivers could be granted on the grounds that the ships are "public vessels" which means

a vessel owned or chartered and operated by the United States.(1:61)

2. REGULATORY GROUPS: Two principal regulatory groups having impact on the NDRF are the United States Coast Guard and the American Bureau of Shipping (ABS). Other groups having lesser impact on the NDRF are the Public Health Service and the Federal Communications Commission (FCC).(1:50)

The responsibilities of the USCG are covered by three Codes of Federal Regulations (CFR's) which are listed in Appendix F. Inspection and survey requirements contained in the CFR's are applicable to all U.S. flag vessels except for MARAD vessels which are exempt by Title 46 Chapter 1, Subpart 90.05. However, as a means of assuring safety in its ships, MARAD has in past emergencies always required that all regulations be met.

The American Bureau of Shipping is a classification society which issues rules for building ships and conducting surveys to insure compliance with these rules. The USCG accepts the ABS as the prime authority assigning and issuing Load Lines under the provisions of the 1966 International Convention.

Requirements for periodic inspections and surveys are listed in various USCG and ABS regulations. Appendix G lists the highlights of these requirements.

The USCG has indicated that if a full-scale mobilization were required the ships of the RRF would be placed in service no matter the status of certification. However, if a limited

emergency occurred and time was not a factor then certain requirements would have to be met prior to the ships entering service.

The Federal Communication Commission (FCC) has many rules regarding required characteristics of ships radios and these are based on statutory, treaty, or international agreements. Although the FCC has stated that it does not have the power to waive such requirements it would be sympathetic to requests for temporary waivers, as long as it is within legal limits.

3. SHIPYARD CAPABILITY: In order to assess the feasibility of the RRF and the NDRF the shipyard capabilities of the United States must be considered. Although the NDRF is maintained in a high state of readiness and preservation a certain amount of shipyard work would have to be accomplished if the ships were required for service.

There are approximately 270 firms throughout the United States that repair ships, of which about thirty-five are capable of performing both drydock and topside work. The remaining 235 firms tend to be rather small and are limited in capability. The thirty-five large companies account for approximately eighty percent of the total dollar value of repair work performed.(1:82)

The U.S. shipbuilding and repair industry is not one of the corporate giants in the country, nor does it attract national attention such as steel, auto or food production. In size it ranks only fortieth on the basis of gross sales, contributes approximately 0.3 percent to the Gross National

Product (GNP) and accounts for a relatively small portion of the national labor force.(9:31) However, these facts and figures are extremely misleading when viewed in the light of their importance to National Defense and the impact they have on regional employment levels.

If the U.S. shipyards are to meet the possible future requirements of national defense they must maintain a competent work force. As of October 1, 1978 U.S. shipyard employees in commercial yards of major size numbered 94,355.(11:260) Estimates put forth by the Shipbuilders Council of America (SCA) forecast a fifty percent decrease in shipyard employment by 1983.(16:3) This decline can be attributed to various factors such as an aging work force much of it dating back to World War II and the Korean Action, and therefore eligible for retirement en masse. Additionally, the Council forecast for revenues reflects a general decline in merchant and naval shipbuilding with a slight increase in ship repair volume. Exhibit 6 projects an estimated annual revenue average for the 1979-1983 time frame. The history of ship repair activity in the U.S. shows that it is an industry which is subject to great fluctuation in wordload. Appendix H displays the average monthly employment in selected commercial yards from 1959-1975.

Naturally if a national emergency takes place and ships are required the work force of the nations shipyards will not remain static. Appendix I displays shipyards by location, number of drydocks and current and mobilization employment

EXHIBIT 6

ESTIMATED ANNUAL REVENUE AVERAGE 1979-1983

MERCHANT FLEET

	(Millions of Dollars) Low	High
Ship Construction		
Tankers	$ 160	$ 220
LNG Carriers	70	90
Dry Cargo/Other Oceangoing Vessels	85	370
Small and Nonpropelled vessels (including barges)	420	580
Great Lakes Vessels	70	100
Ship Repair and Conversion	600	900
Subtotal	$1,405	$2,260

NAVAL FLEET

Ship Construction and Conversion	$1,600	$2,000
Ship Repair and Alteration	750	1,000
Subtotal	$2,350	$3,000

OTHER SHIPWORK

Offshore Drilling Units	$ 50	$ 200
U.S. Coast Guard, Corps of Engineers, Fisheries, etc.	80	125
Subtotal	$ 130	$ 325
Aggregate Total	$3,885	$5,585

Source: Shipyard Weekly January 18, 1979 Number 3 (17:1)

figures are the maximum estimated by MARAD. Naturally this buildup of personnel would take time and coordination, as many of them would be unskilled. The important basis of such planning is that shipyards maintain an adequate skilled labor force to build from when necessary.

United States shipyards presently maintain the capability of activating the RRF in the time frame allowed of five to ten days.(1:86) This capability is further enhanced in light of the fact that the ships of the RRF will not require dry-docking when activated. In addition yards have substantial capability to expand their labor force to handle peak demands. (1:91)

The non-RRF ships in the NDRF would be expected to take longer to activate. These vessels would require thirty to forty days for activation according to MARAD estimates.(1:4)

4. MANNING: Limited emergency actions, in the context of manning, are more difficult to deal with than an all out call-up for general war. In the case of a general war the nation's entire facilities are called upon to support the military and the concentration on the movement of ocean shipping becomes of paramount importance.

As cited earlier, past history has shown that manpower was an important factor in affecting the operation of the NDRF in both the Korean Action and Southeast Asia. Although this problem may not be alleviated in the future many factors have combined to decrease its potential impact. Although the number of ships in the U.S. Merchant Marine has been decreasing

steadily the carrying capacity has actually increased as displayed in Exhibit 7. In addition, the actual number of crew aboard each ship has decreased substantially from about forty to fifty in the 1950's and early 1960's, to as low as twenty-six to thirty on some newer ships.

EXHIBIT 7

Private U.S. Merchant Marine 1950-1976

YEAR	NO. OF SHIPS	Dwt. TONS (000's)
1950	1,087	13,200
1960	1,008	14,100
1970	793	14,400
1976	521	13,500

Although the number of ships has decreased dead weight tonnage has remained fairly steady and is higher than it was before the Korean Police Action.

Source: National Defense Reserve Fleet Response Plan (1:126)

These reductions were accomplished through advanced technology and shipboard mechanization especially in the deck and engineering departments. Thus jobs have peaked from 48,118 in 1967 to a low of 20,501 on January 1, 1976.(1:127) These reductions have resulted in earlier retirements and limited sea time per year for each union member.

As of January 1, 1979 there were 3,507 personnel in training in State and Federal Maritime Academies. In addition union training and upgrading programs are constantly turning out skilled seamen.

In view of the present level of unemployment coupled with the output of maritime training schools, many of whom cannot find seagoing employment, it is doubtful that the shortages that have occurred in the past will occur in the near future if the RRF ships are activated.

However, a general activation of the NDRF would place a demand of approximately 5,000 jobs on the system. In that case contingency planning as listed below would be required:

a. Work out agreement with union to permit crew to ship out during vacations, and permit retirees to reenter service for duration.

b. Obtain understanding with USCG to continue policy of waiving manning requirements, and permit acceleration of upgrading crew and officers especially in critical areas.

c. Accelerated Federal, State and union training and upgrading.

d. Request national exemption from military service if available for officers and skilled crews on ships operating in military zones. (1:129)

Additionally, if these alternatives are not enough or not allowed the possibility of Navy or Civil Service crewing could be explored.

IV. THE PROGRAM

A. GENERAL

Will the NDRF ever be called upon in the future to perform during national emergency? Will the NDRF be ready if called upon, on short notice, to perform as it has in the past? Only time and an actual crisis will accurately answer these questions. Predicting the future is impossible, but lessons should be learned from the past. Although doubts may be raised about national preparedness for war it is apparent that the future of the merchant marine area of defense is being planned and action is being taken.

The NDRF of the future is being prepared for by both MARAD and the Navy. The RRF program is the vanguard of the NDRF future. Having learned many lessons concerning activation problems over the past thirty years, specifically concerning Vietnam and Korea, the NDRF and especially the RRF program are ready for and counting on change. The RRF ships expect to be ready when required and they in turn will buy the time necessary to bring the NDRF ships into action by filling the initial needs of DOD in time of crisis.

A perfect example of the flexibility of the RRF program was the changing of direction from utilizing thirty Victory ships to requiring 340,000 DWT spread among newer ships of various configurations. A minor sign of the change anticipated in the program is that the manual prepared by MARAD which

sets forth the detailed plans and procedures for managing the RRF program, for upgrading the NDRF ships to RRF status, and for activating RRF ships is in loose leaf form in order that change may be disseminated quickly and efficiently.

The immediate future of the RRF program is relatively secure in view of its inclusion in the Five Year Defense Program for FY 1977 through FY 1982. Additionally, there is no current deadline to be met and presently the program is expected to be ongoing past FY 1982. Although a great deal of attention is being given to the RRF ships there has been no indication that the importance of the remaining Victory and other classes of the NDRF will be downgraded. Also there is no projection to replace or scrap large numbers of ships in the near future. The fact that many of the Victory ships have had limited use in their lifetime indicates that they have extensive future service and capability remaining.

B. RRF PLANNING

1. The immediate future of the NDRF basically evolves around the RRF program. MARAD in conjunction with the Navy has developed a four phase activation plan in order that the deadweight tonnage (DWT) equivalent of thirty Victory ships will be fully operational and ready for cargo with five to ten days notice. The four distinct phases are thoroughly discussed in Appendix J. Briefly stated the phases are:

a. Phase 1 - An initial activation to bring the vessels to a ready status.

b. Phase II - The steps required to return vessels to the NDRF in a RRF status.

c. Phase III - Actions to maintain the ships in a RRF status.

d. Phase IV - A final activation for service to make the vessels fully operational.(4:25)

2. As the NDRF has decreased over the years the number of fleet sites have been reduced accordingly from eight to three, one on each coast. They are:

a. Suisun Bay - Martinez, California

b. James River - Fort Eustis, Virginia

c. Neches River - Beaumont, Texas

Each fleet is a complete entity consisting of its own work force, service craft, and equipment. Maintenance and preservation are primarily conducted, since the facilities have no repair or upgrading capabilities. An important factor in the geographical distribution (Exhibit 5, Page 33) of the RRF ships is the availability of shipyards that could accomplish the final Phase IV work. In order to determine the amount of preactivation work to be accomplished a critical path analysis was made in order to ascertain the controlling work items at the time of activation.

Presently there are ten ships in the RRF with a final goal of about thirty ships depending on further trade-ins. A firm commitment on the next group of ships for the RRF has not been made. Although the classes of ships have been altered from the original plan little else has been changed. That is the

the goals, time frames, and activation procedures remain basically the same. Appendices K, L, M and N (Pages 71-74) display the basic characteristics of the ship types presently in the RRF specifically the C4-S-1a (Mariners), C-3-S-33a, VC2-S-AP3 (Victories) and T2-E-A3 (Seatrain).

3. A key element of the RRF program is that the ships will be brought up to full certification status during activation thereby considerably reducing break-out times. Additionally all drydock work will be accomplished during activation thus allowing any bottom cleaning or minor underwater repairs to be accomplished at pierside during break out. The alleviation of a queueing problem at the drydocks during break out will greatly facilitate the ability of the RRF ships to be on berth within the ten days requirement. This will also ease the movement of the remaining NDRF ships into the drydock when they are required.

4. The agreement between the Navy and MARAD calls for a ship to be randomly selected, without notice, with tests to consist of full activation and sea steaming for a twenty-four hour period.(8:3) Theoretically these tests conducted annually will guarantee the validity of the program and attest to the effectiveness of its management. In FY 1977 the S.S. Washington was activated from the NDRF for Reforger '77 and was given an extended sea trial by steaming from Norfolk, Virginia to Rotterdam, the Netherlands and back. In FY 1978 the S.S. Maine took part in Reforger '78. Both ships performed as expected.

There is no reason to assume that the performance of the NDRF ships in their annual exercises will change in the future.

C. CONTRACTURAL ARRANGEMENTS

1. The Master Repair Contract (MRC) is an existing contractural instrument which is used for planning and executing the RRF program. As of January 1, 1976 there were seventy-three contractors operating under MRC with MARAD.(4:36) The shipyards under contract vary in size from having unlimited financial constraints with drydock facilities to those with severe financial constraints and no drydock capabilities.

Geographically, the yards are distributed as follows: 37-Eastern Region (including one on the Great Lakes), 18-Central Region and 19-Western Region.(4:36) These contracts are currently in use by MARAD and will be utilized to activate the RRF ships during these various phases.

2. The General Agency Agreement (GAA) is another existing contractural arrangement which will be used in the planning and eventual operation of reactivated ships. During the Vietnam conflict forty general agents were used for MARAD ships in future emergency the RRF ships are expected to need fewer agents depending on the number of ships used.

The basic difference between the MRC and the GAA contracts is that the former is for repair and activation and the latter is concerned with the actual operation of the ship.

D. PROCUREMENT

Obviously during an emergency the break-out of the reserve fleet will face particular problems concerning the procurement of replacement parts, equipment, and various asundry items. The short time allotted for break-out could cause severe disorder and make impossible competitive methods of procurement. In order to coordinate procurement in such circumstances, a National Priority Designation System has been established for setting procurement priorities. This system is under the direct control of the Joint Chiefs of Staff (JCS), and covers all government procurement systems.(4:37) MARAD will be placed in the National Priority System in advance of activation measures and hopefully many problems will be solved prior to their appearance.

E. THE FUTURE

The future of the NDRF and RRF program depends almost entirely on planning for the unpredictable with no real reference point except the past. MARAD and DOD are obviously not satisfied with the status quo as is evident by their ongoing program to revitalize, improve, and prepare the NDRF. If the future is to be prepared for, the present must be a constant search for improvement. Even though uncertainties are guaranteed the future will invariably belong to those who plan for it and are ready to act when crises appear.

V. CONCLUSIONS

A. SUMMARY

Although conclusions concerning the NDRF and its RRF component can be made it is necessary to note that it is virtually impossible to know all the facts concerning the public policy surrounding the past, present, and future of the reserve ships of our sealift capability. Decisions have been and will be made concerning the NDRF that are influenced by many factors such as cost considerations, political impacts, national defense, and statistical inferences to name a few.

It would be presumptuous to suggest that the conclusions and recommendations included in this study are all encompassing or that they will not change in the near or distant future. Public and national defense policies will never remain static and change is inevitable.

The NDRF has performed well when called upon to sail to war, to lower world freight rates, and for storing surplus agricultural products. It has met the commitments given to it and has required little in return. Also, it must be noted that each time the NDRF was utilized there were no viable alternatives and without its existence both military and economic policies of the United States could possibly have faltered and thereby changing the world balance of power both economically and militarily. Only the imagination can explore the possibilities of a different outcome on the Korean peninsula,

the Marshall Plan or a failure to display determination in Southeast Asia.

B. CONSIDERATIONS

However, drawing from interviews, readings, and experience certain conclusions have been reached and are set forth in the following text.

1. The NDRF was never really planned on and actually came into existence as a by-product of World War II. When the huge number of war surplus ships were laid up no one envisioned the important role and varied uses they would perform in world economics and military strategy. Because of this unplanned creation and unexpected benefit at little cost to the government the NDRF has been taken for granted and seen as an ever existing resource requiring little attention.

2. The United States is an island nation dependent on maritime power for a constant and ever expanding number of resources from overseas. A prime example of waterborn trade upon which the U.S. is dependent is the movement of oil from the Middle East. In 1954, twenty-five percent of our imports came in on U.S. flag ships today that figure is about five percent. In the future, the U.S. may be subject to economic blackmail.(15:9)

3. Unless the possibility of war is eliminated, especially so-called brush fire wars that have become prominant throughout the world, DOD will continue to require sealift capabilities. Although the NDRF and the RRF component meet present DOD

requirements, it is possible that these requirements may fall short of actual need when a crisis occurs. Some possible changes in requirements could occur from:

a. A sudden need to remove U.S. citizens from countries overseas would require additional ships quickly. This would necessitate a sealift in reverse of what is now visualized, thus requiring many more ships.

b. A pre-emptive strike on the active merchant fleet cutting its number drastically and thereby quickly decreasing the sealift capabilities assumed available.

4. The U.S. shipbuilding industry and the U.S. shipping industry will, in order to remain competitive continue to advance maritime technology. Only through automation, greater carrying capacity, and efficiency will Americans be able to continue as a maritime economic power. The industries will not regress to break-bulk all purpose shipping capabilities similar to the ships of the NDRF.

5. The NDRF has in the past suffered from a lack of funds. An example of this shortfall is:

> In FY 1976 maritime authorization, the House Merchant Marine and Fisheries Committee recommended out of a total budget of $589,718,000 only $4,242,000 for the NDRF (less than the amount recommended for maritime training at the Merchant Marine Academy, Kings Point which was $11,500,000 and for the state maritime schools $5,808,000.(5:58)

6. There is a great deal of misunderstanding about the merchant marine and even more about the NDRF by both the public and the military. The merchant marine is never thought of as part of the defense system until required. The NDRF and commercial ships are expected to be available when needed ignoring the fact that break out takes time and that profit making dictates the constant use of active ships. During the 1973 Israeli resupply effort seventy-four percent of the supplies moved by ships even though a great deal was heard about the Military Airlift Command's C-5 and C-141 cargo planes accomplishments. However, it should be noted that the first nine crucial shipments were made by Israeli ships because U.S. ships were not available.(6:33)

7. There is a sharp contrast between the maritime policy of the United States and the maritime policy of the Soviet Union. In the Soviet Union, the commercial fleet, the fishing fleet the oceanographic fleet, and the Navy are closely and directly controlled by Moscow.(15,8) However, in the U.S. separation of maritime interests is almost as great as the separation of church and state.

8. The prime consideration to be given to activating the NDRF and the RRF is not the question of the ships but rather the availability of trained knowledgable seamen. Additionally, although the shipyards are and will be available, the shortage of skilled workers could seriously hamper activation procedures and cause severe delays too.

Although many drawbacks concerning the NDRF have been alluded to there are positive signs for the future.

1. Apparently the almost orphan status of the NDRF has been altered in view of the fact that the U.S. Navy, with MARAD guidance, will expend $42.9 million during a five year program to update the ships. Obviously, interest has been renewed in the NDRF and its position in national defense has been secured for the near future.

2. Signs of communication and cooperation are beginning to show between the merchant marine and the Navy. Not only in the financial area but also on the personnel level and material areas such as:

a. Communication tests have been conducted between military and non-military ships.

b. MARAD personnel have been involved with national and Nato military authorities concerning logistic war plans.

c. U.S. merchant ships conduct periodic exercises with Navy units such as exercise Roller Coaster and exercise Reforger both conducted in 1977.

d. Officers are periodically exchanged between the Navy and the merchant marine under the auspices of the Running Mate Program.(2:68)

C. FINAL CONCLUSIONS

Even though not all these programs and exercises deal directly with the NDRF they are important in order that

cooperation, knowledge, and understanding come about between the Navy and the merchant marine. Even if complete integration of purpose and direction cannot be accomplished at least a spirit of cooperation and common purpose can be attained for the good of the nation as a whole.

Although MARAD and the Navy have done a great deal to ready the NDRF for possible service many problems still exist. These problems will require solving prior to a smooth flow of shipping from NDRF anchorages to the loading berths and ultimately the wartime unloading zone.

Although the negative conclusions outweigh the positive ones in number, it should not be interpreted that the NDRF is out of date or poorly managed. Quite the opposite, the conclusions of this study are that the NDRF is extremely well managed and the NDRF is a ready and viable asset for the Department of Defense and the country in general.

VI. RECOMMENDATIONS

A. GENERAL

If the U.S. Merchant Marine and the NDRF are deemed necessary by DOD, and the country in general, then an overall comprehensive national maritime policy needs to be formulated rather than the patchwork policy now followed. Clearly shipping and shipbuilding are intricate parts of the American defense policy. This idea has been fostered and developed throughout U.S. history by maritime laws and clearly stated by declaration of policy.

However, rhetoric and good intentions alone will never bring about a strong viable reserve fleet of ships ready to be called into action when needed. What is required is clear decisive action on the part of MARAD, DOD, and above all the Congress of the United States. Without the support of Congress nothing can be accomplished. The NDRF must not be relegated to secondary importance in the area of ongoing national defense but rather it must be considered along with all other primary factors as an integral part of our economic and military well-being.

B. RECOMMENDATIONS

The following recommendations are set forth for the future improvement and ensured dependability of the NDRF. Again, the implication should not be perceived that the present policies

concerning the NDRF are unsatisfactory but rather that there is always room for improvement and no policy should remain static in a changing world.

1. Justify the required tonnage periodically and review it under varying scenarios.

2. Accelerate and expand the RRF program. In view of uncertain world conditions perhaps a five year program is too lengthy as the ships may be required this year and not in 1982. Additionally, losses due to activation delays and sinkings should be expected during a crisis and additional tonnage may be required faster than the NDRF could provide it.

3. Ensure agreement between all cognizant parties required for activation such as DOD, Navy, DOC, MARAD, USCG, ABS, FCC, unions, and agents. Verify that they agree completely and know thoroughly what is required and expected from each of them. As little as possible should be left to chance. After the crisis occurs discovering avoidable fallacies in the system will frustrate and further delay ship deliveries.

4. Conduct periodic inspections of the ships and spare parts inventories annually, preferably by independent agencies with full reports submitted to MARAD, DOD, and Congress.

5. Identify the necessary shipyards and operating agents well in advance and a central authority, MARAD, should periodically determine their capability to perform these required functions.

6. Project manpower requirements both ashore and afloat realistically and avoid statistical pitfalls. Varying sources

give conflicting solutions for solving manpower problems. Studies conducted for the Navy suggest the possible use of civilians in Navy ships to alleviate shortages.(14:9) Meanwhile studies conducted for MARAD put forth the possible use of military crews in merchant ships to satisfy shortages. (1:129) In view of this conflict a complete study should be performed projecting the seagoing manpower in the future with disregard for civilian or military status. Obviously such a study would have to be coordinated with both MARAD and the Navy, and it is recommended that it be done by an independent agency.

7. Expand joint exercises conducted by the Navy and the merchant marine such as exercise Reforger. In the past one ship annually has been exercised from the East/Gulf Coast fleets. If the undertaking is to be truly creditable more ships from the Atlantic, Gulf, and Pacific Coasts should be utilized. Additionally, the randomness of the ship choices should be ensured to avoid using the best or only sailable ships each year and thus allowing a false sense of security.

8. Replace and modernize the NDRF as quickly as possible with newer and better ships. Two possible changes to the program are offered:

a. The possibility of buying other ships on the world market should be explored. These purchases could coincide whenever shipping is in a recession and excess tonnage is being sold cheaply.

b. The possibility of building a new class of inexpensive, break-bulk self-sustaining ships should be thoroughly researched. These ships could be financed by scrapping old ships and building modularly in order to hold down the cost.

9. Complete and thorough research should be conducted to assess the feasibility of various ship designs for military purposes such as containers, LASH, and Ro/Ro classes. Perhaps new unloading methods and systems can be developed which will render the DOD need for break-bulk ships obsolete or at least decrease the requirement significantly.

10. Above all if the NDRF and especially the RRF program are to continue to expand and to contribute meaningfully to national defense the funds expended by the Navy and MARAD must be spent wisely. The money is limited and poor control cannot be allowed. Additionally, in this era of Proposition 13 funding projects that do not offer immediate return should be handled carefully. Any hint of improprieties could be met with funds being discontinued and a vital asset could be lost due to shortsighted and poor management.

C. SUMMARY

Although control of the NDRF and the RRF contingent should remain with MARAD, DOD must take an active interest in them to assure that its requirements are being met. DOD should not only cooperate and work with MARAD in an owner/customer

relationship but also in the sense of a partner relationship. That is MARAD and DOD must present to Congress and the American public a solid front in order to gain the funding required and understanding necessary for a highly important defense program. Sub-optimization cannot be allowed, the common good must be all important.

D. THE IDEAL

The ideal solution for DOD would be the non-requirement of the NDRF. In order for this to occur the active fleet of the U.S. Merchant Marine would have to expand considerably. However, for this to happen drastic changes in national policy must be undertaken. The United States should develop and establish itself as a maritime economic power and reduce its dependence on foreign flag shipping.

The development of Soviet mercantile power should be of special concern to the American public. Charles I. Hiltzheiner, Chairman of Sealand Service Inc., a unit of R.J. Reynolds Industries Inc., told a forum in Portland, Oregon, recently that, "The Soviet Union is deliberately placing an iron curtain of ships on the Pacific and Atlantic Oceans between us and our allies, to isolate us physically and economically from the rest of the world."(12:12) Perhaps a government agency should be set up to sell the merchant marine to the American public much in the way the Civil Aeronautics Board (CAB) has successfully promoted the airlines.

A final characteristic of the ideal solution is to have all U.S. transportation, both domestic and international brought together under the auspices of one and only one regulatory department in order that coordination and cooperation could be enhanced, and conflict and redundancy be significantly decreased.

APPENDIX A

Problem Areas During Activation

The following is a list of problem areas causing lost time of reactivated ships during the Vietnam Conflict:

1. Boiler (tubing leaks, bottom blow valve spool, header, boiler water testing line, soot blower, level indicators)
2. Condenser (tubes leaking)
3. Electrical (turbogenerator, emergency diesel generator, electrical control panel, electrical system, starting motor, fan motor)
4. Fresh water evaporator (tubing)
5. Pumps (turbine feed pump, fuel oil pump, feed pump governors, sanitary pump, main condensate pump motor, main circulating pump, miscellaneous pumps)
6. Main Engine (turbine, reduction gears, throttle)
7. Refrigeration (domestic reefer boxes, main refrigeration system)
8. Piping (salt water lines)
9. Radio, Radar, Echo Sounder
10. Telemotor
11. Topping lifts
12. Winches (winch controls, winch armature, lifeboat winches)
13. Anchor windlass motor

Source: National Defense Reserve Fleet Response Plan (1:27)

APPENDIX B

GENERAL AGENCY AGREEMENT VESSEL MAINTENANCE AND REPAIR COSTS IN SOUTHEAST ASIA PROGRAM

YEAR	TOTAL VOYAGE DAYS OPERATION	TOTAL M&R COST	M&R COST PER VOYAGE DAY
1965	1,697	$ 379,664	223
1966	34,135	15,049,402	441
1967	66,064	30,960,248	468
1968	51,503	21,016,082	408
1969	29,914	15,100,154	505
1970	7,596	2,434,381	320
Total	190,909	$84,940,261	

$$\frac{\text{Total M\&R Cost}}{\text{Total Voyage Days}} = \frac{\$84,940,261}{190,909}$$

= $445 Total Average M&R Cost Per Voyage Day

Source: National Defense Reserve Fleet Response Plan (1:29)

APPENDIX C

Delayed Sailing Due to Crew Shortage

YEAR	SAILINGS	NUMBER OF SAILINGS DELAYED	PERCENT OF SAILINGS DELAYED	DAYS DELAYED	ESTIMATED ADDITIONAL COSTS (1)
1966	323	160	50	548	$1,479,600
1967	563	245	44	833	2,708,300
1968	519	187	36	829	2,901,500
Total	1,405	592	42	2,210	$7,089,400

(1) Based on operating costs of from $2700 to $3500 per day exclusive of fuel costs.

Source: National Defense Reserve Fleet Response Plan (1;33)

APPENDIX D

Oily Wastes - According to 37 CFR 246, Subchapter 0 - Pollution, all vessels constructed before July 1, 1974 operating in U.S. navigable waters or contiguous zones (12 miles offshore) are required to have:

1. Capacity to retain on board oily waste and oily bilge slops that may accumulate while operating in the navigable waters or contiguous zones.

2. For fuel oil discharge containment, (1) a fixed container or enclosed deck area of at least two barrels capacity under and around each fuel tank vent, overflow and fill pipe; or (2) a portable container at least 18 inches deep which has at least a 5 gallon capacity under each fuel tank vent, overflow and fill pipe; or (3) a flush deck fitting which is being serviced by an automatic back pressure shutoff nozzle.

3. At least one pump installed to discharge oily bilge slops or ballast through a fixed pipe system which shall have at least one standard discharge outlet on each side of the weather deck.

4. Each such outlet should have a shore connection or the vessel should have at least one portable adapter that fits the outlets.

5. A means on the weather deck near the discharge to stop each pump used to discharge oily waste and a stop valve installed at each outlet.

6. A placard that states "The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters and contiguous zone of the United States if such discharge causes a film or sheen upon, or discoloration of, the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of $5,000."

Source: National Defense Reserve Fleet Response Plan (1:58)

APPENDIX E

MARINE SANITATION DEVICES - Various requirements regarding overboard discharge are stated in 40 CFR 21, Part 159 - Marine Sanitation Devices. These rules specify certification procedures, and design and construction requirements. They affect existing as well as new vessels.

Victory ships were constructed before promulgation of the marine sanitation devices (MSD) regulations and standards. Under the regulations for existing vessels, it is not necessary to install any type of MSD until January 30, 1980, after which it is mandatory to install Type 11 or Type 111 MSD's. If the Type 1 Device is installed by January 30, 1978, then Type 1 may be used indefinitely.

Type 1 Device -	U.S.C.G. certified overboard discharge to 1000 fecal coliform per 100 ml plus no "visible floating solids" standard.
Type II Device -	U.S.C.G. overboard discharge certified to 2000 fecal coliform per 100 ml plus 150 mg/l total suspended solids standards.
Type III Device -	U.S.C.G. certified to no-discharge standard (i.e., this can be a holding tank with means to pump either shoreside or overboard beyond the 12 mile limit).

Source: National Defense Reserve Fleet Response Plan (1:60)

APPENDIX F

Codes of Federal Regulations

Responsibilities of the Coast Guard are covered in the following Codes of Federal Regulations (CFR's):

Title 33 - Navigation and Navigable Waters
Chapter 1 Coast Guard, Department of Transportation (Parts 0-199)

Title 46 - Shipping
Chapter 1 - Coast Guard, Department of Transportation (Parts 0-199)
Chapter III - Coast Guard (Great Lakes Pilotage), Department of Transportation (Parts 400-499)

Title 49 - Transportation
Chapter I - Coast Guard, Department of Transportation (Parts 400-499)

Source: National Defense Reserve Fleet Response Plan (1:50)

APPENDIX G

TYPE OF INSPECTION	INTERVAL OF INSPECTION (YEARS) U.S.C.G.	A.B.S.
Special Periodic Survey		4 (1)
Boiler and steam piping hydrostatic	4	4 (2)
Inspection for Certification	2 (3)	
Reinspection or Annual	10 to 14 mos. after certification (4)	1 (5)
Drydocking	2 (6)	2 (6)
Tail Shaft withdrawal	3 (7)	3 (7)
Cargo gear	4 (8)	
Load Line Certificate		5 (9)
Boiler Studs and Boltings		8

Notes:

1. Includes drydocking and detailed examination of hull, fittings, ground tackle, machinery, auxiliary and electrical equipment, boiler and steam piping hydrostatic tests (as per Coast Guard rules), internal combustion engines, controls, refrigeration systems, shafting and bearings, etc., included opening and closing of equipment where required. The ABS allows one year of grace within which to complete the Special Periodic Survey; however, this does not extend the four year interval.
2. Part of Special Periodic Survey.
3. Visual and operation inspection of hull, machinery, life saving equipment, fire mains, pollution prevention, sanitation, etc.
4. General visual check on Inspection for Certification.
5. General visual check of hull and machinery.
6. Permits extension of docking intervals based on special circumstances i.e., operation in fresh water, ship lay-up, special coatings, impressed current hull protection, etc.
7. Can be extended under special circumstances, but not more than one additional year (per Coast Guard)
8. Requires complete cargo gear load test with winches, also proof tests of equipment. Coast Guard requires annual check for condition and suitably.
9. Delegated by Coast Guard to ABS; check for correct load marks and also require annual survey for endorsement.

Source: National Defense Reserve Fleet Response Plan (1:53)

APPENDIX H

AVERAGE MONTHLY EMPLOYMENT IN SELECTED COMMERCIAL SHIP REPAIR YARDS WITH DRYDOCK FACILITIES (as of January of each year)

	TYPE OF WORK PERFORMED				
Year	MARAD	Navy	Other Federal	Private	Total
1959	25	1,654		4,883	6,562
1960		312		4,610	4,922
1961	16	1,470		4,143	5,629
1962		1,948		4,777	6,725
1963		1,106		4,418	5,524
1964		1,638		4,296	5,934
1965		5,775		5,246	11,021
1966	653	5,148		5,523	11,324
1967	288	6,171		7,714	14,173
1968	2	5,901	251	6,733	12,887
1969	10	5,763	79	5,951	11,803
1970		10,127	95	5,863	16,085
1971	55	6,499	238	8,128	14,920
1972	1	5,793	208	6,856	12,858
1973		2,778	61	4,792	7,631
1974		4,160	68	5,423	9,651
1975		2,756	212	6,389	9,357

Source: National Defense Reserve Fleet Response Plan (1:85)

APPENDIX I

Ship Repair Yards/Employment

Ship Repair Yard	No. of Drydocks	Employment	
		Current (1975)	Mobilization
EAST COAST			
Bethlehem Steel Baltimore, Md.	4*	1,740	9,900
Bethlehem Steel Boston, Mass.	2	270	800
Bethlehem Steel Hoboken, N.J.	5	650	7,300
Brewer D.D. Co. Staten Island, N.Y.	2	200	1,700
Ira S. Bushey Brooklyn, N.Y.	1*	215	720
Coastal D.D. & Repair Brooklyn, N.Y.	2*	250	2,000
Detyens Shipyard Mt. Pleasant, S.C.	1*	460	700
Jacksonville Shipyards Jacksonville, Fla.	4*	2,385	2,835
Maryland S.B. & D.D. Co. Baltimore, Md.	3	1,900	12,000
Newport News SB & DD Co. Newport News, Va.	6	22,400	41,000
Norfolk SB & DD Corp. Norfolk, Va.	1*	2,150	3,600
Savannah Mach. & DD Co. Savannah, Georgia	1	430	800
Sun SB & DD Co. Chester, Penna.	2	4,450	35,000
Todd Shipyards Brooklyn, N.Y.	4	590	4,000

APPENDIX I (Continued)

Ship Repair Yard	No. of Drydocks	Employment	
		Current (1975)	Mobilization
GULF COAST			
Alabama DD & SB Co. Mobile, Ala.	2	3,200	29,000
Bethlehem Steel Beaumont, Texas	1	3,075	5,100
Livingston, S.B. Co. Orange, Texas	1*	2,080	3,700
Tampa Ship Repair Tampa, Fla.	1	400	1,100
Todd Shipyards Galveston, Texas	1	905	4,000
Todd Shipyards Houston, Texas	1	800	2,175
Todd Shipyards New Orleans, La.	2	415	2,500
WEST COAST			
Bethlehem Steel San Francisco, Calif.	2	800	3,310
Bethlehem Steel Term. Island, Calif.	2	460	7,500
Lockheed SB & Const. Co. Seattle, Wash.	2*	1,740	6,600
National Steel & SB Co. San Diego, Calif.	2*	5,230	10,000
Port of Portland Portland, Oregon	3	n.a.	n.a.
Todd Shipyards Alameda, Calif.	2	650	4,000
Todd Shipyards San Pedro, Calif.	2	2,460	8,000
Todd Shipyards Seattle, Wash.	3	1,200	7,200
Willamette Iron & Steel Richmond, Calif.	5	515	2,170

* Yard as additional drydock(s) not large enough to accommodate a Victory ship. Employment data, however, are for the entire yard as no separation could be made.

Source: National Defense Reserve Fleet Response Plan (1:85)

APPENDIX J

Four phased activation plan:

Phase I - There are 146 work items for Phase I (Activation) -- 16 to be performed in drydock and 130 topside. These range from checking keys for proper identification to placing the main engine in operation. The Phase I (Activation) work is estimated to require up to 44,000 man-hours per ship (1976 production rates; changes in labor agreements and government regulations could change production rates) and $140,000 (1976 prices) for material. This amount of work is necessary in this Phase I activation in order to permit the final activation for service to be accomplished with the 5-10 day requirement. Supplemental repairs, which would differ with each individual ship, are not covered in the Phase I standard specification but are estimated to average $162,000 (1976 prices) per ship. These estimates will be verified in the first fiscal year in which this program is implemented during which a limited number of initial activations will be performed.

Phase II - (Deactivation) specification covers the work necessary to prepare the ship for return to the National Defense Reserve Fleet in a ready status and commences after the completion of the dock trial under Phase I. It is estimated that this work will require up to 4,750 manhours and $16,000 (1976 prices) for material per vessel.

Phase III - (Activation Retention in Ready Reserve Status) specification covers the work necessary to be performed by the National Defense Reserve Fleet personnel to hold the ships in the Ready Response status. This effort differs substantially from current retention procedures by adding a rapid response objective to the retention procedure. The work steps outlined in the specification are estimated to require one man year per year per ship.

Phase IV - (Activation for Service) specification is estimated to require approximately 9,400 man-hours. This work can be performed within the 5-10 day breakout requirement since no drydocking will be required at the time of the final activation. The usual activation bottleneck, i.e., available drydock capacity, is therefore avoided at the time of activation for service.

Source: Ready Reserve Fleet (4:4)

APPENDIX K

The basic characteristics of Mariners are:

Length Overall	563'-73/4"
Length, B.P.	528'-0"
Length, 20 Stations	520'-0"
Beam, Molded	76'-0"
Depth to Main Dk., Mld. at side	44'-6"
Depth to 2nd. Dk., Mld. at side	35'-6"
Bulkhead Dk.	2nd. Dk
Machinery	Turbine
Designed Sea Speed	20 Knots
Shaft Horsepower, Normal	17,500
Shaft Horsepower, Maximum	19,250
Full Load Draft, Mld.	29'-9"
Full Load Displacement	21,093 Tons
Light Ship Displacement	7,675 Tons
Light Ship VCG	31.5'
Light Ship LCG aft F.P.	276.5'
Passengers	12
Crew	58
Grain Cubic	837,305 Cu. ft.
Bale Cubic	736,723 Cu. ft.
Reefer Cubic	30,254 Cu. ft.
Fuel Oil (D.B.'s+Settlers)	2,652 Tons
Fuel Oil (Deep Tanks)	1,156 Tons
Fuel Oil, Total	3,808 Tons
Fresh Water	257 Tons
No. of Holds	7
Gross Tonnage	9,215
Net Tonnage	5,367

Source: Military Sea Transportation Service Supplement Loading A. Mariner - Class Ship (13:6)

APPENDIX L

The basic characteristics of a C-3-S-33a are:

Length, Overall	483'-3"
Length, Waterline	464'-0"
Length between Perpendiculars	458'-0"
Breadth Molded	68'-0"
Depth to Main Deck Side	41'-6"
Draft Mean, Full Load	28'-6"
Draft, Scantling	31'-9"
Displacement, Light Ship	5,920
Fuel Oil, Tons	2,082
Fresh Water, Tons	127
Stores, Tons	40
Personnel and Effect, Tons	8
Misc. Deadweight, Tons	57
Dry Cargo, Tons	4,937
Refrigerated Cargo, Tons	399
Cargo Oil, Tons	2,830
Cargo Deadweight	8,166
Total Deadweight	10,480
Displacement, Full Load	16,400
Cargo Volume, Bale	544,872
Cargo Volume, Grain	604,377
Cargo Volume, Refrigerated	33,900
Cargo Volume, Oil	113,198
Passenger Accommodations	12
Crew Accommodations	55
Propelling Mach	High Pressure Steam Turbine Double Red. Gearing
Shaft Horsepower, Normal	11,000
Service Speed-Knots	18
Booms	5-ton, 10-ton and 1-60/75 ton

Source: Ready Reserve Fleet (4:App. F)

APPENDIX M

The basic characteristics of Victories are:

Length, overall	455'-3"
Length between perpendiculars	436'-6"
Beam, molded	62'-0"
Depth, molded to main deck	38'-0"
Draft maximum for scantlings and at Subdivision	28'-6"
Fuel Oil Capacity, double bottom tanks	1235.8 Tons
Fuel Oil Capacity, deep tanks	1518.6 Tons
Fuel Oil Capacity, settling tanks	128.2 Tons
Total Fuel Oil, tanks 98% full	2882.6 Tons
Total dry cargo (Grain)	523,740 C.F.
Total dry cargo (Bale)	453,210 C.F.
Total Fresh Water	294.9 Tons
Booms, Fourteen	5 Tons
Booms, One	30 Tons
Booms, One	50 Tons
Crew	58
Passenger Accommodations	None
Propelling Machy.	High Pressure Steam Turbine Double Red Gear
Normal. S.H.P.	8500
Service Speed	16.5

Source: Ready Reserve Fleet (4:App. F)

APPENDIX N

The basic characteristics of Seatrains are:

Length, Overall	559'-11"
Breadth (Molded)	68'-0"
Depth (Molded to Main Dk.)	39'-3"
Height (Keel to Span Dk.)	62'-3"
Maximum Draft Loaded	27'-0"
Light Ship (Incl. Ballast)	10,663
D.W. Tonnage (At Deep Draft)	10,337
Displacement Tonnage	21,000
Fuel Capacity (BBLS.)	16,500
Shaft H.P.	10,000
Speed (Knots)	16.5

Source: Ready Reserve Fleet (4:App. F)

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11. Assoc. Professor R.A. Weitzman, Code 54 Wz 1
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Naval Postgraduate School
Monterey, California 93940

12. Assoc. Professor A.W. McMasters, Code 54 Mg 1
Department of Administrative Sciences
Naval Postgraduate School
Monterey, California 93940

13. Assoc. Professor P.R. Milch, Code 55 Mh 1
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